IN THE CLAIMS:

1. (CURRENTLY AMENDED) A method for modifying packet header data transferred from a context memory internal to a forwarding engine to an output buffer of the forwarding engine, the method comprising the steps of:

reading one or more instructions, by a processor of the forwarding engine, each instruction indicating an operation to modify the packet header data;

generating, in response to the one or more instructions, one or more commands wherein each command is associated with the operation to modify the packet header data;

placing the one or more commands in a data structure;

initiating a transfer of the packet header data from the context memory internal to the forwarding engine to the output buffer of the forwarding engine; and

performing, by a ~~device~~ data mover in the forwarding engine coupled to the context memory and the output buffer and operating independently from the processor, the operations associated with the one or more commands contained in the data structure, to modify the packet header data as directed by the one or more commands while the packet header data is being transferred from the context memory internal to the forwarding engine to the output buffer of the forwarding engine.

2. (PREVIOUSLY PRESENTED) The method as defined in claim 1 further comprising the step of:

acquiring the packet header data from the context memory internal to the forwarding engine.

3. (PREVIOUSLY PRESENTED) The method as defined in claim 2 further comprising the steps of:

generating a bit mask associated with the acquired packet header data; and

transferring the bit mask and the acquired packet header data to the output buffer of the forwarding engine.

4. (PREVIOUSLY PRESENTED) The method as defined in claim 2 wherein the data structure comprises one or more entries wherein each entry is associated with a command and the entry contains information associated with a range of addresses and an operation code that are associated with the command.

5. (CURRENTLY AMENDED) The method as defined in claim 4 further comprising the steps of:

searching the data structure for an entry containing information associated with a range of addresses that matches a range of addresses associated with the acquired packet header data;

if a matching entry is found, determining if an operation code contained in the matching entry indicates a delete data operation; and

if so, generating a delete bit mask that represents data that is deleted in the acquired packet header data and transferring the delete bit mask and the acquired packet header data to the output buffer of the forwarding engine.

6. (PREVIOUSLY PRESENTED) A method for modifying packet header data transferred to an output buffer, comprising:

initiating, by a processor, a transfer of acquired packet header data to the output buffer;

accessing a data structure including one or more entries containing information associated with a range of addresses and an operation code; and

modify the acquired packet header data while the packet header data is being transferred to the output buffer by,

searching the data structure for an entry containing information associated with a range of addresses that matches a range of addresses associated with the acquired packet header data,

if a matching entry is found, determining if an operation code contained in a matching entry indicates an insert data operation, and if so,

a) generating a leading bit mask that represents leading data contained in the acquired packet header data,

b) transferring the leading bit mask and the acquired packet header data to the output buffer,

c) acquiring insert data,

d) generating an insert data bit mask that represents the insert data,

e) transferring the insert data bit mask and the insert data to the output buffer,

f) generating a lagging bit mask that represents lagging data contained in the acquired packet header data, and

g) transferring the lagging bit mask and the acquired packet header data to the output buffer.

7. (PREVIOUSLY PRESENTED) The method as defined in claim 4 wherein each entry contains a length and a source address associated with the command.

8. (PREVIOUSLY PRESENTED) The method as defined in claim 7 comprising the step of:

searching the data structure for an entry containing information associated with a range of addresses specified by the combination of the length and the source address

contained in the entry that matches a range of addresses associated with the acquired packet header data.

9. (PREVIOUSLY PRESENTED) The method as defined in claim 1 wherein the data structure is a table.

10. (PREVIOUSLY PRESENTED) The method as defined in claim 1 comprising the step of:

clearing the data structure.

11-12. (CANCELLED)

13. (PREVIOUSLY PRESENTED) A system comprising:

a context memory internal to a forwarding engine configured to hold packet header data;

a data structure configured to hold one or more commands;

a processor of the forwarding engine configured to read one or more instructions, each instruction indicating an operation to modify the data, and in response generate one or more commands to modify the data, the processor further configured to place the one or more commands in the data structure;

an output buffer of the forwarding engine; and

a data mover coupled to the context memory internal to the forwarding engine and the output buffer of the forwarding engine and configured to, upon initiation of a transfer of the packet header data from the context memory internal to the forwarding engine to the output buffer of the forwarding engine, acquire the packet header data from the context memory internal to the forwarding engine, and modify the packet header data as

directed by the one or more commands contained in the data structure, while the packet header data is being transferred from the context memory internal to the forwarding engine to the output buffer of the forwarding engine.

14. (PREVIOUSLY PRESENTED) The system as defined in claim 13 wherein the data structure is a table.

15. (PREVIOUSLY PRESENTED) The system as defined in claim 13 wherein the data structure comprises one or more entries wherein each entry is associated with a command and the entry contains information associated with a range of addresses and an operation code that are associated with the command.

16. (PREVIOUSLY PRESENTED) The system as defined in claim 15 wherein the data mover is configured to search the data structure for an entry containing information associated with a range of addresses that matches a range of addresses associated with the acquired packet header data and if a matching entry is found, determine if the operation code contained in the matching entry indicates a delete data operation and, if so, generate a delete bit mask that represents data that is deleted in the acquired packet header data.

17. (CURRENTLY AMENDED) ~~The system as defined in claim 15~~ A system comprising:

a context memory configured to hold packet header data;

a data structure including one or more entries containing information associated with a range of addresses and an operation code;

an output buffer; and

a data mover coupled to the context memory and the output buffer and configured to, upon initiation of a transfer of packet header data from the context memory to the

output buffer, acquire the packet header data from the context memory, search the data structure for an entry containing information associated with a range of addresses that matches a range of addresses associated with the acquired packet header data and if a matching entry is found, determine if the operation code contained in the matching entry indicates an insert data operation and if so, (i) generate a leading bit mask that represents leading data contained in the acquired packet header data, (ii) transfer the leading bit mask and acquired packet header data to the output buffer, (iii) acquire insert data, (iv) generate an insert data bit mask that represents the insert data, (v) transfer the insert data bit mask and insert data to the output buffer, (vi) generate a lagging bit mask that represents lagging data contained in the acquired packet header data, and (vii) transfer the lagging bit mask and the acquired packet header data to the output buffer.

18. (PREVIOUSLY PRESENTED) The system as defined in claim 15 wherein each entry in the data structure contains a length and a source address associated with the command.

19. (PREVIOUSLY PRESENTED) The system as defined in claim 18 wherein the data mover is configured to search the data structure for an entry containing information associated with a range of addresses specified by the combination of the length and the source address contained in the entry that matches a range of addresses associated with the acquired packet header data.

20. (PREVIOUSLY PRESENTED) The system as defined in claim 13 wherein the data mover is configured to generate a bit mask associated with the packet header data and transfer the bit mask to the output buffer of the forwarding engine.

21. (PREVIOUSLY PRESENTED) The system as defined in claim 20 wherein the output buffer of the forwarding engine comprises:

data steering logic configured to use the bit mask to identify valid data contained in the transferred packet header data;

a working register coupled to the data steering logic and configured to hold the valid packet header data transferred from the data steering logic; and

an output queue coupled to the working register and configured to hold the valid packet header data transferred from the working register.

22. (PREVIOUSLY PRESENTED) An apparatus for modifying packet header data transferred from a context memory internal to a forwarding engine to a output buffer of the forwarding engine, the apparatus comprising:

means for reading one or more instructions, each instruction indicating an operation to modify the packet header data;

means for generating, in response to the one or more instruction, one or more commands wherein each command is associated with an operation to modify the packet header data;

means for placing the one or more commands in a data structure;

means for holding the one or more commands and not performing the operations associated with the one or more commands until initiation of a transfer of the packet header data from the context memory internal to the forwarding engine to the output buffer of the forwarding engine; and

means for performing, independent from the means for generating, the operations associated with the one or more commands contained in the data structure, to modify the data as directed by the one or more commands while the packet header data is being transferred from the context memory internal to the forwarding engine to the output buffer of the forwarding engine.

23. (PREVIOUSLY PRESENTED) The apparatus as defined in claim 22 comprising:

means for acquiring the packet header data from the context memory internal to the forwarding engine.

24. (CURRENTLY AMENDED) The apparatus as defined in claim 23 comprising:

means for generating a bit mask associated with the acquired packet header data; and

means for transferring the bit mask and the acquired packet header data to the output buffer of the forwarding engine.

25. (PREVIOUSLY PRESENTED) The apparatus as defined in claim 23 wherein the data structure comprises one or more entries wherein each entry is associated with a command and the entry contains information associated with a range of addresses and an operation code that are associated with the command.

26. (PREVIOUSLY PRESENTED) The apparatus as defined in claim 25 comprising:

means for searching the data structure for an entry containing information associated with a range of addresses that matches a range of addresses associated with the acquired packet header data;

means for determining if the operation code contained in a matching entry indicates a delete data operation; and

means for generating a delete bit mask that represents data that is deleted in the acquired packet header data and transferring the delete bit mask and the acquired packet header data to the output buffer, if the operation code in the matching entry indicates a delete data operation.

27. (CURRENTLY AMENDED) An apparatus comprising:

means for acquiring packet header data;

means for accessing a data structure including one or more entries containing information associated with a range of addresses and an operation code;

means for searching the data structure for an entry containing information associated with a range of addresses that matches a range of addresses associated with the acquired packet header data;

means for determining if the operation code contained in a matching entry indicates an insert data operation; and

means for modify the acquired packet header data while the packet header data is being transferred to an output buffer by (i) generating a leading bit mask that represents leading data contained in the acquired packet header data, (ii) transferring the leading bit mask and the acquired packet header data to the output buffer, (iii) acquiring insert data, (iv) generating an insert data bit mask that represents the insert data, (v) transferring the insert data bit mask and the insert data to the output buffer, (vi) generating a lagging bit mask that represents lagging data contained in the acquired packet header data, and (vii) transferring the lagging bit mask and the acquired packet header data to the output buffer, if the operation code indicates an insert data operation.

28. (PREVIOUSLY PRESENTED) A computer readable medium comprising computer executable instructions for execution in a processor for:

reading one or more instructions indicating an operation to modify packet header data;

generating, in response to the one or more instructions, one or more commands wherein each command is associated with the operation to modify the packet header data;

placing the one or more commands in a data structure;

holding the one or more commands and not performing the operations associated with the one or more commands until initiation of a transfer of packet header data from a

context memory internal to a forwarding engine to an output buffer of the forwarding engine; and

performing the operations associated with the one or more commands contained in the data structure, to modify the packet header data as directed by the one or more commands while the packet header data is being transferred from the context memory internal to the forwarding engine to the output buffer of the forwarding engine.

29. (PREVIOUSLY PRESENTED) The computer readable medium as defined in claim 28 comprising computer executable instructions for execution in a processor for:

acquiring the packet header data from the context memory internal to the forwarding engine.

30. (PREVIOUSLY PRESENTED) The computer readable medium as defined in claim 29 comprising computer executable instructions for execution in a processor for:

generating a bit mask associated with the acquired packet header data; and

transferring the bit mask and the acquired packet header data to the output buffer of the forwarding engine.

31. (PREVIOUSLY PRESENTED) The computer readable medium as defined in claim 29 wherein the data structure comprises one or more entries wherein each entry is associated with a command and contains information associated with a range of addresses and an operation code that are associated with the command.

32. (PREVIOUSLY PRESENTED) The computer readable medium as defined in claim 31 comprising computer executable instructions for execution in a processor for:

searching the data structure for an entry containing information associated with a range of addresses that matches a range of addresses associated with the acquired packet header data;

if a matching entry is found, determining if an operation code contained in the matching entry indicates a delete data operation; and

if so, generating a delete bit mask that represents data that is deleted in the acquired packet header data and transferring the delete bit mask and the acquired packet header data to the output buffer of the forwarding engine.

33. (PREVIOUSLY PRESENTED) The computer readable medium as defined in claim 31 comprising computer executable instructions for execution in a processor for:

initiating a transfer of the packet header data to an output buffer;

accessing a data structure including one or more entries containing information associated with a range of addresses and an operation code; and

modify the packet header data while the packet header data is being transferred to the output buffer by,

searching the data structure for an entry containing information associated with a range of addresses that matches a range of addresses associated with the acquired packet header data,

if a matching entry is found, determining if an operation code contained in a matching entry indicates an insert data operation, and if so,

a) generating a leading bit mask that represents leading data contained in the acquired packet header data,

b) transferring the leading bit mask and the acquired packet header data to the output buffer,

c) acquiring insert data,

d) generating an insert data bit mask that represents the insert data,

e) transferring the insert data bit mask and the insert data to the output buffer,

f) generating a lagging bit mask that represents lagging data contained in the acquired packet header data, and

g) transferring the lagging bit mask and the acquired packet header data to the output buffer.

34. (PREVIOUSLY PRESENTED) A method comprising:

reading one or more instructions, by a processor of a forwarding engine, indicating an operation is to be performed on packet header data;

generating, in response to the one or more instructions, one or more commands associated with the operation;

placing the one or more commands in a data structure;

initiating a transfer of the packet header data from a context memory internal to the forwarding engine to an output buffer of the forwarding engine;

searching the data structure for an entry containing information associated with a range of addresses that matches a range of addresses associated with the packet header data;

determining from the entry that the operation is an insert data operation; and

performing the insert data operation, by a device operating independently from the processor, by determining a leading portion of the packet header data, transferring the leading portion of the packet header data to the output buffer, acquiring insert data, transferring the insert data to the output buffer of the forwarding engine, determining a lagging portion of the packet header data, and transferring the lagging portion of the packet header data to the output buffer of the forwarding engine.